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SHEET END DEFLECTING DEVICE FOR DUPLICATORS

Filed Dec. 15, 1937

2 Sheets-Sheet 1

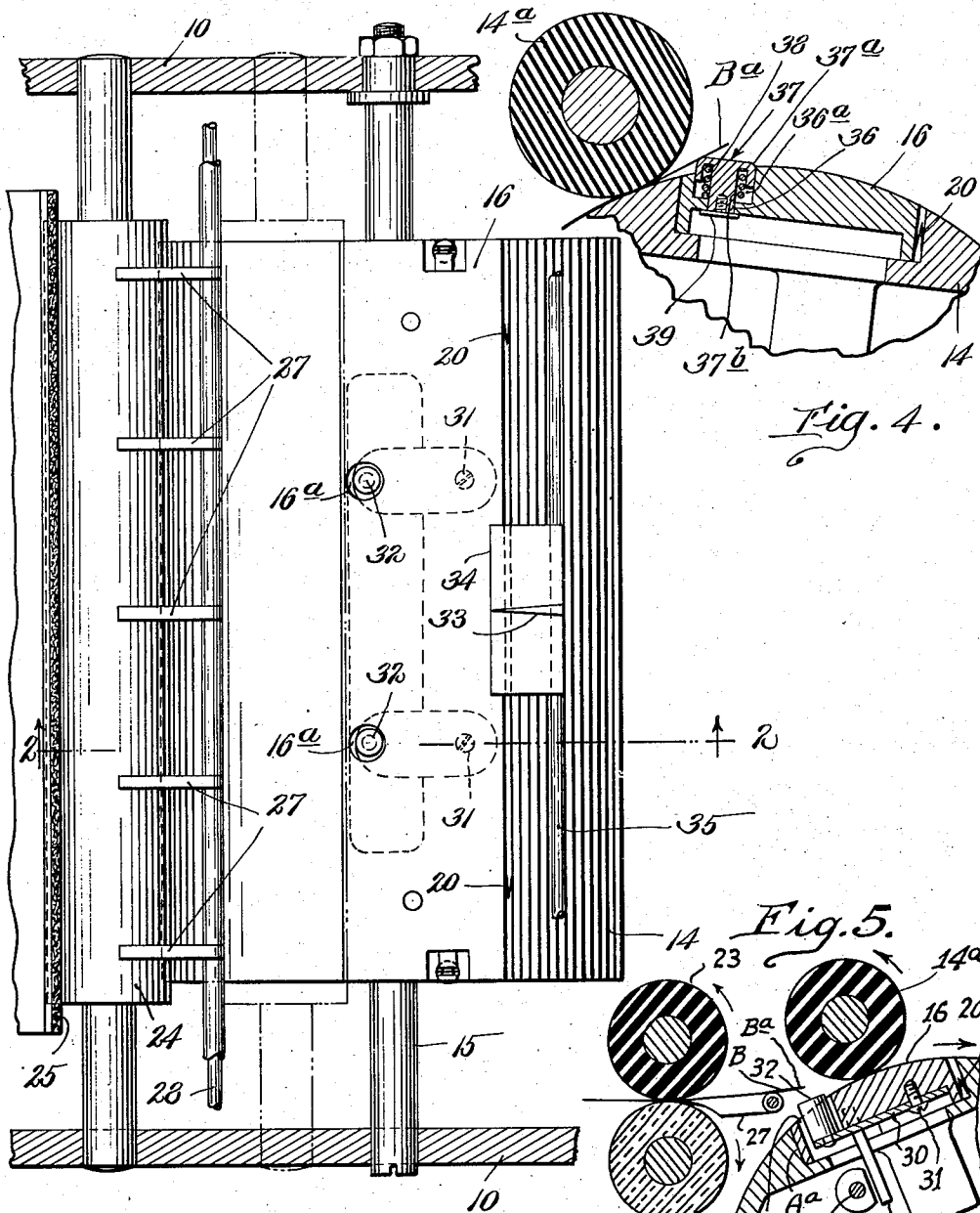


Fig. 1.

Fig. 4.

Fig. 5.

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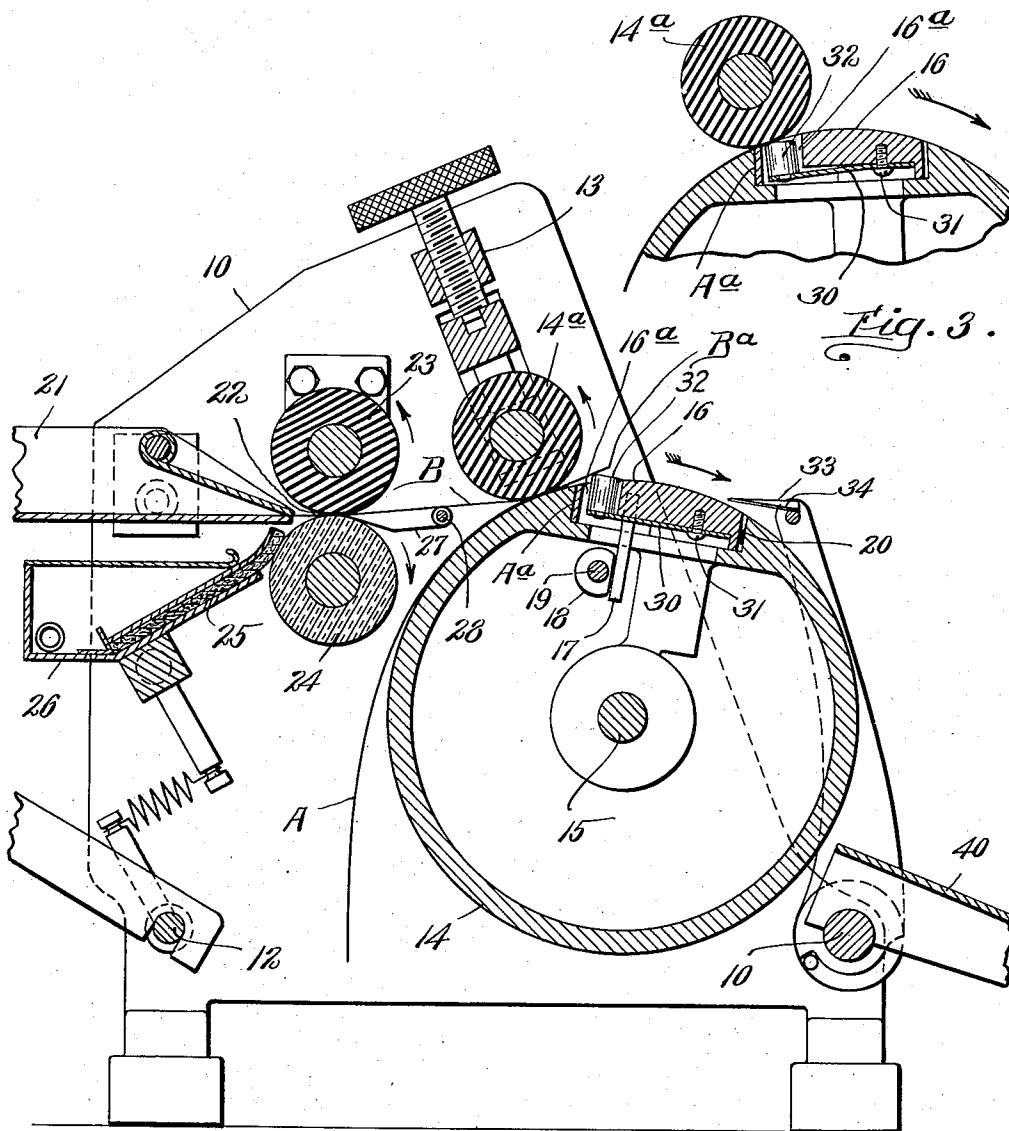


Fig. 2.

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UNITED STATES PATENT OFFICE

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SHEET END DEFLECTING DEVICE FOR
DUPLICATORS

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Application December 15, 1937, Serial No. 179,928

5 Claims. (Cl. 101—132.5)

This invention relates to improvements in duplicating machines, and more particularly the invention relates to a device for deflecting the advance end of a sheet, after it has been moistened and duplicated upon, to assure of the sheet being removed from the printing drum.

Duplicating machines to which the present improvement is particularly adapted are well known as so-called wet process duplicators, and wherein it is the practice to moisten a clear sheet of paper or the like that is to be duplicated upon. The clear moistened sheet is advanced for registering engagement under pressure with a master copy sheet which is secured to the revoluble printing drum or platen. A duplicating machine of the referred to type and embodying these general characteristics for duplicating on a previously moistened clear sheet is illustrated in the Patent Re. 19,951, issued to Frederick W. Storck on April 28, 1936.

In using paper of a thin or light weight, and having the general characteristics of, for example, a tissue or like paper, when the sheet is moistened and then engaged under pressure with the master copy, to form a duplicate copy thereof, the sheet has a tendency to cling to the master copy and drum, thus preventing a proper discharging of the duplicated copy from the machine.

It is known that in connection with printing drums or platens, various devices have been provided for insuring the proper stripping of the sheet from the printing drum. These devices invariably comprise fingers that are carried by or associated with the drum, with a separate mechanism particularly adapted to actuate the fingers so that they will function in a timed relation to the revolving of the drum.

Accordingly, it is one of the principal objects of the present invention to provide resilient means carried by the drum for the purpose of insuring proper stripping of the sheet from the drum that will not require separate mechanism for the proper functioning of the device.

Another object of the present invention is to so arrange and position the device that it will be automatically effective at a determinate point in the cycle of rotation of the drum and wherein present required elements of the machine are utilized in the operation of the device.

A still further object of the invention is to provide a device that is simple in construction and with few working parts that may be readily and conveniently embodied or associated with the printing drum or platen.

With the above and other objects in view, our invention comprises a novel combination and arrangement of parts hereinafter described and more specifically pointed out in the appended claims.

The above objects are intended as a general explanation and are not to be construed as limiting the invention thereto, as further objects and advantages will be evident from the drawings and the description thereof.

In the accompanying drawings we have shown a preferred type of our device embodied with a duplicating machine printing platen or drum in a manner sufficient to enable those skilled in the art to understand the construction and operation thereof.

Referring to the drawings:

Fig. 1 is a plan view of a portion of a wet process duplicating machine having our improvements embodied therewith.

Fig. 2 is a transverse section of a wet process duplicating machine and taken substantially along line 2—2, Fig. 1.

Fig. 3 is a fragmentary sectional elevation, showing our device as illustrated at Fig. 2, but with some of the parts in a different position.

Fig. 4 is a fragmentary sectional elevation showing a modified form of our device embodied with a portion of a printing platen or drum.

Fig. 5 is a fragmentary sectional view corresponding substantially to Fig. 3, but shows the feed rollers with the sheet in an advancing position and just prior to its engagement with the printing drum.

The duplicating machine

The duplicating machine shown in the drawings is provided with opposed side frames 10 in which are mounted the operating elements of the duplicator. These opposed side frames 10 are retained in spaced relation by suitable tie rods such as are indicated at 11, 12 and 13. The printing drum or platen 14 is rotatably mounted on the shaft 15 which, in turn, is secured against rotation in the side frames.

The drum may be rotated in a desired manner by mechanism such as gears and a prime mover (not shown).

In the present instance, the printing drum 14 is of a hollow cylindrical construction, see Fig. 2, and the face wall thereof is cut away to receive a clamp bar 16 that extends between the opposed end walls of the drum. This clamp bar 16 may be of a suitable construction and adapted to secure the edge Aa of the master sheet A to the

drum. The illustrated clamp bar 16 is provided with depending lugs 17 that are arranged to be engaged by a cam member 18 secured on a rotatable shaft 19 which extends lengthwise of the drum 14. Rotation of the shaft 19 causes the cam 18 to engage with the lugs 17 and move the clamp bar 16 against its compression springs 20, thus releasing the clamped end Aa of the master.

The clear sheet B, that is to be duplicated upon, is advanced from the stack support 21 into engagement in the bight 22 formed by the feeding rollers 23, 24 that are rotated in unison with the printing drum by gearing or like connections (not shown).

In the illustrated machine, the lower roller 24 is disposed to function as a combined feeding and moistening roller. The face of this lower roller 24 engages with a fibrous material 25 which extends into a tank 26 that is adapted to receive and maintain a supply of the moistening fluid. As the rollers 23, 24 are rotated, the fibrous material 25 supplies the face of the roller with a thin film of fluid and this limited moisture is transferred from the roller 24 to the face of the sheet as the sheet is advanced by and between these feeding rollers 23, 24.

To prevent the clear sheet from adhering to the face of the moistening roller 24, we have provided a plurality of stripping fingers 27 that are disposed between the feeding rollers 23, 24 and the drum 14. These fingers 27 are pivotally mounted on a transverse rod 28 that is supported in the opposed side frames of the machine. The terminating ends of the fingers 27 are relatively thin and are adapted to engage with the face of the moistening roller and closely adjacent the bight formed by the feeding rollers 23, 24. As the sheet B is moistened and advanced by and between the feeding rollers 23, 24, the fingers 27 will insure that the moistened sheet will be stripped from the face of the moistening roller 24 and advanced into engagement in the bight formed by the drum 14 and its coacting pressure roller 14a where the sheet is further advanced under pressure in engagement with the master copy.

A duplicating machine of the above general referred to character is fully shown and described in the hereinbefore referred to Patent Re. 19,951, and, therefore, further detailed description of a machine in which our improvements may be embodied is thought to be unnecessary.

Sheet deflecting device

In the present structure, the inner face of the clamp bar 16 is recessed to provide for flat springs 30 that are secured to the clamp bar by means of screws 31. The outer or free ends of the springs 30 have, in this instance, pins 32 that are secured thereto. These pins 32 project outwardly through openings 16a in the clamp bar 16 and normally extend beyond the outer face of the clamp bar.

As the drum 14 is rotated, in the direction of the arrow, the pins 32 will remain in their normal projected position until engaged by the pressure roller 14a, see Fig. 3, and depressed. It is to be noted that the pins 32 are positioned in advance of the clamped end Aa of the master as the master and drum are rotated in the direction of the arrow.

A modified form

In the modification illustrated at Fig. 4, the clamp bar 16 is provided with countersunk bores 36 adapted to slidably receive studs, generally

indicated at 37, and having an enlarged head portion 37a adapted to engage in the enlarged diameter countersink 36a while the shank 37b of the stud engages in the smaller diameter of the bore 36. Compression springs 38 are disposed in the countersink 36a of the bores 36. These springs encircle the shank 37b of the studs 37 and have a bearing at one end under the stud heads 37a while the opposite ends of said springs have a bearing against the bottom of the countersink 36a. These springs urge the stud head 37a outwardly. The terminating ends of the stud shanks 37b are provided with stop caps 39 that limit the outward movement of the studs to a position where the stud heads normally project beyond the outer face of the clamp bar 16.

When the stud heads 37a are engaged by the compression roller 14a, during the rotation of the drum 14, the studs are depressed against the action of the springs 38, and, as the drum 14 continues its rotation, the studs are released to deflect the front margin end Ba of the sheet as above described relative to the pins 32 illustrated at Figs. 2 and 3.

Operation

The advance end Ba of the sheet to be duplicated upon engages in the bight, formed by the printing drum 14 and its coacting pressure roller 14a, in advance of the clamped end Aa of the master copy A, thus effecting a narrow margin at the forward end of the sheet B. It is to be noted, referring to Fig. 5, that the feeding of the sheet B, by the rollers 23, 24 and the rotation of the drum 14, are so related that the front end Ba of the sheet is disposed to overlie a portion of the outer faces of the deflecting pins 32 as the front end Ba and the pins 32 advance in unison toward the bight formed by the drum 14 and its coacting pressure roller 14a. As the drum 14 continues in its cycle of rotation, and the margin end Ba and depressed pins 32, Fig. 3, pass from their engagement with the pressure roller 14a, the springs 30 will urge the pins to their normal projecting position, thus deflecting the margin end Ba of the sheet outwardly from the face of the drum 14, Fig. 2.

As the drum is further rotated, the deflected margin end Ba will be engaged by the narrow raised finger 33 of the guide 34 and guided away from the drum 14 to be deposited in a suitable receiving tray 40. It is to be noted that the raised finger 33 will engage with only a very limited area of the face of the duplicated copy as it is advanced, thus preventing the entire duplicated face of the sheet from contacting with the guide 34 and its supporting rod 35 and, as the duplicated characters may not be completely dried, this eliminates blurring of the characters during the advancement of the sheet from the drum.

From the foregoing, it is obvious that we have devised a simple device that may be conveniently and effectively embodied with a printing drum or platen and will insure of the removal of a moistened sheet after it has been engaged under pressure with the printing drum and master copy and while particularly adapted to a machine of the character herein described, it is obvious that its adaptability may be varied for similar requirements in other machines.

Having thus described our invention, what we claim is:

1. In a duplicating machine of the character specified having a printing drum and means for clamping one end of a master copy to said drum

and a pressure roller coacting with the drum in a manner to form a bight therebetween, together with combined feeding and moistening rollers adapted to simultaneously moisten and advance
 5 a sheet to be duplicated upon into said bight to register in engagement with said master copy, means for rotating said rollers and drum in unison, in combination with a plurality of strip-
 10 per fingers disposed between said drum and combined feed rollers and engaging with one of said combined feeding and moistening rollers, resilient means carried by said drum and nor-
 15 mally extending beyond the peripheral face thereof, said last means being disposed slightly in advance of said clamped master end and adapted to deflect the advance end portion of
 20 said sheet to be duplicated upon outwardly from the peripheral face of said drum after said end portion has passed between said drum and pres-
 25 sure roller, a guide disposed to receive said duplicated end and retain the advancing sheet free from contact with said drum as said sheet is advanced, said guide embodying a raised portion adapted to engage with only a limited area of
 the face of said advancing sheet.

2. In a duplicating machine of the character specified having a printing drum and means for securing a master copy to said drum with a pres-
 30 sure roller coacting with said drum and forming a bight therebetween, means for feeding a sheet to be duplicated upon into said bight for advancement in registering engagement with said
 35 master copy, resilient means disposed in the peripheral face of said drum and having portions normally extending outwardly from said face that are adapted to engage with the forward end portion of said sheet, after said end has advanced beyond said bight, to elevate said end

portion from the peripheral face of said drum.

3. In a duplicating machine of the character specified having a printing drum and means for clamping a master copy to said drum, with a
 5 pressure roller coacting with said drum and forming a bight therebetween, means for feeding a sheet to be duplicated upon into said bight for advancement in registering engagement with
 10 said master copy, resilient means disposed in the face of said drum and having portions normally extending beyond the peripheral face thereof, said last means being disposed slightly in ad-
 15 vance of said clamped master and adapted to deflect the advance end portion of the sheet to be duplicated upon outwardly from the peripheral face of said drum after said end portion
 has passed between said drum and pressure roller.

4. A duplicating machine embodying a rotatable printing drum and a coacting pressure
 20 roller with a clamp bar carried by said drum, means for actuating said clamp bar to secure a master copy to said drum, depressible spring-actuated sheet end deflecting means disposed in
 25 said clamp bar and normally projecting beyond the outer face thereof.

5. A duplicating machine embodying a rotatable printing drum and a coacting pressure roller
 30 with a clamp bar carried by said drum, together with means for actuating said clamp bar to secure one edge of a master copy to said drum, a plurality of depressible spring-actuated members
 35 disposed in said clamp bar and in advance of the clamped edge of said master, said members normally projecting outwardly from the face of said clamp bar.

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